

## CLAIMS

1. Apparatus (10) for measuring the weight of a preform for optical fibres during a chemical deposition process for the formation of a preform, characterised in that it  
5 comprises:
  - at least one elastic constraint (11a, 11b) intended to be associated with at least one end portion (100a, 100b) of an elongated element (100) constituting a chemical deposition substrate for the formation of the preform  
10 (200);
    - a device (110) for inducing an oscillation on said elongated element (100);    - a device (111) for detecting the frequency of oscillation of said elongated element (100);    - 15 - a device (112) for calculating the weight of the preform (200) according to the detected frequency of oscillation.
2. Apparatus according to claim 1, wherein said at least one elastic constraint (11a, 11b) is a constraint with a  
20 single degree of freedom such as to allow an axial oscillation of said elongated element along its longitudinal axis X-X.
3. Apparatus according to claim 2, wherein said at least one elastic constraint (11a, 11b) comprises:  
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  - a first coupling element (12a) suitable for being rigidly associated with a rotatable chuck (3a);  - a second coupling element (13a) suitable for being rigidly associated with said elongated element (100);  
wherein said first and second coupling elements (12a, 13a)  
30 are elastically and slidably coupled and are rotatably constrained.
4. Apparatus according to claim 3, wherein said first coupling element (12a) defines a first sleeve and said at least one elastic constraint (11a) also comprises a second sleeve (17a) rigidly associated with said at least one end  
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portion (100a) of said elongated element (100) and coaxially mounted inside said first sleeve (12a) through the interposition of at least one bearing (18a) suitable for allowing a relative sliding between said first and 5 second sleeves (12a, 17a) along said axis X-X.

5. Apparatus according to claim 4, also comprising a ball joint (19a) placed between said second sleeve (17a) and said at least one end portion (100a) of said elongated element (100).

10 6. Apparatus according to any one of claims 3 to 5, also comprising a pin (16a) associated with said first coupling element (12a) and slidably coupled with a slot (15a) formed on said second coupling element (13a).

15 7. Apparatus according to any one of claims 2 to 6, wherein said main axis X-X is a horizontal axis, the apparatus (10) comprising two opposite sliding elastic constraints (11a, 11b) suitable for being associated with opposite end portions (100a, 100b) of said elongated element.

20 8. Apparatus according to any one of claims 2 to 6, wherein said main axis X-X is a vertical axis, the apparatus (10) comprising a single sliding elastic constraint (11a) suitable for being associated with an end portion (100a) of said elongated element (100).

25 9. Apparatus according to any one of the previous claims, wherein said device (110) for inducing the oscillation is housed inside said at least one elastic constraint (11a, 11b).

30 10. Apparatus according to claim 9 when dependent upon claim 3, wherein said device (110) for inducing the oscillation comprises a pneumatic device (20, 21, 22) acting upon said second coupling element (13a).

11. Apparatus according to claim 9 when dependent upon

claim 3, wherein said device (110) for inducing the oscillation comprises an electromagnetic device (30, 31, 32) acting upon said second coupling element (13a).

12. Apparatus according to any one of the previous claims,  
5 wherein said device (111) for detecting the frequency of oscillation comprises a device (40, 41) for detecting the position of said elongated element (100), suitable for generating a signal indicating said position, and a device for processing said signal to work out the frequency of  
10 oscillation of the elongated element.

13. Apparatus according to claim 12, wherein said device (111) for detecting the position of said elongated element (100) comprises a target (40) intended to be rigidly associated with said elongated element (100) and an optical  
15 measurer (41) of the distance of said target (40).

14. Apparatus according to claim 13, wherein said optical measurer (41) comprises an emission source of a luminous signal towards said target (40), a device for receiving the luminous signal scattered by said target (40), and a device  
20 for processing the collected luminous signal to generate an electric signal representing the distance of said target (40).

15. Method for measuring the weight of a preform for optical fibres during a chemical deposition process for the formation of a preform, characterised in that it comprises  
25 the steps of:

- elastically constraining an elongated element (100) constituting a chemical deposition substrate to a chemical deposition machine (1) for the formation of the preform;
- 30 - inducing an oscillation of said elongated element (100);
- detecting the frequency of oscillation of said elongated element (100);
- calculating the weight of the preform (200) according  
35 to the detected frequency of oscillation.

16. Method according to claim 15, wherein the step of inducing an oscillation of said elongated element (100) comprises the following steps:

- supplying pressurised air, for a predetermined time, 5 inside a seat (132a) housing an end portion (100a) of said elongated element (100);
  - discharging the air from said seat (132a) after said predetermined time.

17. Method according to claim 15, wherein the step of 10 inducing an oscillation of said elongated element (100) comprises the following steps:

- supplying current, for a predetermined time, into a solenoid (30) arranged on the outside of and coaxially to a coupling element (13a) rigidly associated with said 15 elongated element (100), such a coupling element (13a) comprising at least one permanent magnet (32);
  - interrupting the supply of current after said predetermined time.

18. Method according to any of claims 15 to 17, wherein the 20 step of detecting the frequency of oscillation of said elongated element (100) comprises the following steps:

- generating a signal representing the position in time of said elongated element (100);
  - processing said signal to work out the frequency of 25 oscillation of the elongated element (100).

19. Method according to claim 18, wherein the step of generating a signal representing the position in time of said elongated element (100) comprises the steps of:

- sending a luminous signal towards a target (40) rigidly 30 associated with said elongated element (100);
  - collecting a luminous signal scattered by said target (40); and
    - processing the collected luminous signal to generate an electric signal representing the distance of said target 35 (40).

20. Chemical deposition machine (1) for the formation of a preform for optical fibres, comprising:

- a frame (2) intended to support along an axis X-X an elongated element (100) constituting a chemical deposition

5 substrate for the formation of a preform (200);

- at least one burner (4) intended to deposit on said substrate (100) a chemical substance for the formation of a preform;

characterised in that it comprises a weight measurement 10 apparatus (10) according to any one of claims 1 to 14.

21. Chemical deposition process for the formation of a preform for optical fibres, characterised in that it comprises the steps of measuring the weight of the preform, during the chemical deposition, through a method according

15 to any one of claims 15 to 19.